

## ***Interactive comment on “SO<sub>2</sub> noontime peak phenomenon in the North China Plain” by W. Y. Xu et al.***

**Anonymous Referee #1**

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General review:

In this paper, frequent SO<sub>2</sub> noontime peak phenomenon was discovered in NCP, which was different from other places in the world. The possible causes were analyzed. The impacts on the sulfur cycle were studied and the implications of the phenomenon for atmospheric chemistry, cloud physics and climate were discussed. This is a very interesting paper, that authors provided new data and their own original study results. It should be accepted after minor revision.

Some comments and suggestions: 1, in 2.4.1, the dry deposition velocity of SO<sub>2</sub> was taken from Tsi (2010), it should be described if it was suitable to NCP area. 2, in 2.4.2, the radiation data were not described. 3, for gaseous oxidation, the VOCs data taken

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in summer season were used in three seasons. A sensitivity test of VOCs should be done, since it could be a non-liner process. 4, in 2.4.3, the haze process had not been described. 5, in page 5662 line 4-7, the uncertainties were discussed for assuming the trace gas concentration. The conclusion was that will not have influences in the inter-comparison between the groups. In fact, this conclusion could be suitable to other two processes, if there were liner. There is a suggestion that the uncertainty discussion should be done in all of three processes 6, in Fig.5, there are more lines and dots with different colors, which could be identified in electronic version. For paper publication, it would be difficult to identify. Maybe a large figure should be shown in paper publication. 7, in page 5662 line 17-18, the language is not clear. 8, for abbreviation sem (in page 5657 line 21 and page 5663 line 4) it's better to write in capitals SEM.

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